

James spinymussel MVP information

FERC determination (pg 1-3, FERC BA)

James spinymussel were not present during mussel survey efforts for the proposed crossings of Craig Creek. The nearest known population of James spinymussel in Craig Creek occurs approximately 15.0 stream miles downstream of the Action Area, and the nearest presumed presence of James spinymussel is 11.8 stream miles downstream of the Action Area. Based on the location of known and presumed populations of this species relative to the crossings at Craig Creek, the lack of mussels or suitable habitat within the Action Area, and MVP's commitment to not cross Craig Creek from May 15 to July 31, no individuals are expected to be directly or indirectly harmed or harassed and no James spinymussel designated critical habitat would be affected by the Project. Thus, the Project *is Not Likely to Adversely Affect* James spinymussel.

Survey information/occurrence (pg 7-31, FERC BA)

The MVP would traverse one stream known to support populations of James spinymussel: Craig Creek. James spinymussel occur within Craig Creek in Botetourt and Craig Counties, Virginia, which are downstream of the proposed MVP crossings. The MVP would traverse the upper portion of Craig Creek in Montgomery County, Virginia. No occurrence records of James spinymussel in Montgomery County have been documented. At the time of mussel surveys in 2015, the MVP route traversed the mainstem of Craig Creek four times within approximately 2,624 feet of stream reach. Three crossings were proposed for the installation of the pipeline and the fourth was a ford crossing at an existing, private access road. The access road traversed the stream between proposed pipeline crossing locations. A subsequent route modification in the vicinity of the Craig Creek crossings eliminated two of the formerly-proposed pipeline crossings. The MVP route now entails a single pipeline crossing of Craig Creek and a temporary access road crossing that would span the creek.

Mountain Valley conducted a mussel survey in October 2015 of the Craig Creek pipeline crossing that extended 0.85 mile downstream and 0.14 mile upstream. The survey yielded no sign of James spinymussel or any other freshwater mussel species within the survey extent. The nearest known occurrence of James spinymussel in Craig Creek is approximately 15.8 stream miles downstream of the pipeline crossing and 15.0 miles downstream of the Action Area. The known occurrence record is a single live individual collected in March 1987 near the [REDACTED]. Known occurrences and abundances of James spinymussel increase from the [REDACTED] downstream beyond the mouth of Johns Creek. Although there have not been many recent mussel surveys in Montgomery County based on an assessment of VADGIF survey records, numerous surveys were completed in Craig Creek in Montgomery County in the 1980s and 1990s. None of these surveys documented live James spinymussels or records of deadshell. The nearest known mussel occurrence, which included non-listed species such as *Villosa constricta*, *Strophitus undulatus*, and *Elliptio complanata*, was in 1991 in Craig County and approximately 12.6 miles downstream of the Project crossing.

AMMs (pg 5-7, FERC BA)

Mountain Valley would implement the following avoidance and minimization measures for crossing Craig Creek:

- the MVP pipeline would cross Craig Creek once and an access road would cross Craig Creek via a bridge; previously proposed Project routes included four crossings of Craig Creek, including three pipeline crossings and use of an existing access road ford crossing; the access road crossing was modified to entail improvement of the access road and construction of a bridge to span the stream and thereby minimizing instream disturbances;
- Mountain Valley would adhere to standards established in VADEQ Virginia Erosion & Sediment Control Field Manual (1995) and implement enhanced erosion and sediment (E&S) control BMPs in sensitive areas and/or high water-energy areas (yet to be determined);
- most of the Craig Creek valley traversed by the Project is owned by Jefferson National Forest; Mountain Valley is coordinating with the FS to minimize potential impacts of sedimentation on Craig Creek; an alternatives analysis was completed to assess various alignments near the Craig Creek crossing that produces the least amount of potential sedimentation impacts (see section 3.0 of the final EIS);
- Mountain Valley is committed to minimizing the duration of bare soil exposure during construction and restoration; Mountain Valley would minimize the time elapsed between vegetation clearing and grubbing/ grading/ trenching in the Craig Creek Valley; the construction timeline would immediately follow tree clearance within the Craig Creek watershed
- Mountain Valley would apply temporary seed/mulch to topsoil piles at the end of the day they are created;
- Mountain Valley would temporarily mulch/seed disturbed right-of-way if the areas would remain inactive for more than 4 days at any point during construction and through installation of the pipeline and backfill to rough grade; if the right-of-way would remain inactive for more than 4 days once returned to rough grade, Mountain Valley would apply temporary seed/mulch to stabilize the area until full restoration is complete (Mountain Valley construction can accommodate an eight-week timeframe between right-of-way stabilization (e.g., backfill, mulching) and restoration);
- Mountain Valley would mulch back-filled areas of the trench within 4 days;
- Mountain Valley would leave temporary sediment control measures in place for one year after seeding;
- Mountain Valley would reduce the right-of-way width at the Craig Creek crossing to less than 75 feet;
- Mountain Valley would keep riparian timber and vegetation intact within 50 feet of each streambank and clearing activities would only occur immediately prior to instream construction; and
- Mountain Valley would not conduct instream construction activities during time of- year-restrictions for the James spinymussel (May 15 to July 31) in Craig Creek because of known populations downstream of the Action Area.

Effects of Action on JSM (pg 8-67, FERC BA)

8.6 JAMES SPINYMUSSEL

Exposure to increased sedimentation can impact freshwater mussels by negatively affecting physiological energetics. Mussels open their aperture to feed. In heavily silted water, individuals are forced to close their valves up to 90 percent of the time, as opposed to 50 percent for individuals living in silt-free environments (Brim Box and Mossa, 1999). Extended aperture closure results in starvation or a state of semi-starvation. Extensive exposure to suspended sediments in the water column also affects individuals by clogging gill filaments, which

significantly impacts feeding efficiency and filtering clearance rates, which can result in mortality (Brim Box and Mossa, 1999).

Project construction, operation, and maintenance activities could potentially cause direct and indirect effects to the James spinymussel. Mountain Valley surveyed the Project crossings at Craig Creek for mussels and did not document any sign of James spinymussel. As described in sections 8.6.1 to 8.6.4 below, based on the lack of individuals in the Action Area and location of known and presumed populations of this species relative to the crossings at Craig Creek, the Project is not expected to result in take of the James spinymussel.

Sedimentation is expected to increase in the Craig Creek watershed from instream construction activities and upland land disturbances. These actions could affect baseline water quality conditions by augmenting existing erosion rates and sedimentation, and by introducing contaminants into the streams via overland runoff, ditches, and swales, particularly in areas adjacent to streams. Mountain Valley investigated the necessity for two ATWS's (ATWS-1373 and ATWS-1057) that are proposed within 100 feet of Craig Creek and a brief portion of the right-of-way that parallels the stream. The temporary workspaces are proposed for placement between Craig Creek Road and Craig Creek and a 100-foot buffer cannot be maintained at either temporary workspace. Both workspaces are at the center of the valley with no access from the north for 1.5 miles and no access from the south for 1.9 miles. ATWS-1373 is currently a pasture and would be needed for boring of Craig Creek Road, additional material staging, spoil storage, and parking of construction vehicles. ATWS-1057 is a maintained field that would be needed for timber storage, construction vehicle parking, and material staging. Access roads border ATWS-1057 that would provide pipe trucks the ability to ingress and egress the right-of-way. In addition, a section of the right-of-way would parallel approximately 100 feet of Craig Creek (near MP 219.9) before the route would be directed southward and toward the top of Brush Mountain. Mountain Valley attempted to maintain the requested 100-foot buffer in this area, but side slope construction conditions would present safety concerns if the right-of-way were shifted further from Craig Creek.

Mountain Valley conducted a sedimentation analysis within the Craig Creek drainage to estimate baseline sediment loading rates and potential sediment loading rates anticipated as a result of MVP construction activities. The sedimentation model was used to analyze each stream reach of Craig Creek, assuming implementation of Mountain Valley's Erosion and Sediment Control (E&SC) Plan, the VADEQ Virginia Erosion & Sediment Control Field Manual (VADEQ, 1995), and Mountain Valley's avoidance and minimization measures outlined in section 5.0. By adherence to aforementioned standards, a 0.29-mile stream reach of Craig Creek would be anticipated to experience sediment load increases in excess of 10 percent above baseline. Three small, unnamed tributaries of Craig Creek could experience sedimentation rates in excess of the 10-percent threshold. Two tributaries on the south-facing slope enter Craig Creek approximately 0.24 mile and 0.35 mile upstream of the Project crossing, respectively. The sedimentation rates in Craig Creek at the mouth of each tributary would be consequently elevated but would not exceed 10 percent above baseline. The third unnamed tributary is on the northfacing slope and empties into Craig Creek approximately 0.51 mile downstream of the pipeline crossing. Sedimentation rates in the third tributary would exceed the 10 percent threshold and contribute to increased sedimentation rates in Craig Creek proper for 0.29 mile

downstream of the tributary mouth. Therefore, increased sedimentation rates over the 10-percent threshold would be to a stream segment that is located 0.51 mile to 0.80 mile downstream of the pipeline crossing. In summary, the Action Area would be contained within 0.80 mile downstream of the pipeline crossing of Craig Creek and within the negative mussel survey area.

8.6.1 Direct and Indirect Effects on Individuals

The nearest known population of James spinymussel in Craig Creek occurs approximately 15.8 miles downstream of the proposed pipeline crossing. Live mussels have not been encountered (or documented) in Craig Creek in Montgomery County. The nearest known occurrence of live mussels in Craig Creek was documented in Craig County in 1991 and consisted of three non-listed mussel species. Nonetheless, presence of James spinymussel is assumed to occur at this historic survey location because conditions are suitable for the occupation of live mussels. Therefore, the nearest known presumed presence of James spinymussel is located in Craig County, 12.6 miles downstream of the Project crossing. Sedimentation rates above a 10-percent threshold in Craig Creek are predicted to extend only 0.80 miles downstream of the pipeline crossing. The Action Area occurs more than 11.8 stream miles upstream of the nearest presumed James spinymussel occurrence. Additionally, the mussel survey extent completed in 2015 encompassed the entirety of the Action Area in Craig Creek and was void of mussels and suitable habitats.

The absence of James spinymussel in the MVP Action Area within Craig Creek stream areas indicates Project activities would not directly or indirectly affect individuals of the species.

From Appendix O: 2.6 Data Analysis (Pg 03-19)

Unfortunately, a nationally-accepted sedimentation standard or exceedance threshold is not available. Attempts to establish such a standard have been stymied by five ecological realities (Kemp et al. 2011): 1) the amount of sediment inputs to streams exhibits substantial natural variation, 2) sedimentation regimes may differ in portions of the same stream based on highly localized factors such as riparian land cover, 3) sediments from different geological sources may have different physical properties and biological effects, 4) even closely related aquatic taxa may respond in markedly different ways to similar levels of sediment, and 5) different life stages of a single species may respond in markedly different ways to similar levels of sediment. Without a nation-wide standard, different regulatory entities use a wide variety of metrics, such as turbidity and total suspended solids, to assess potential changes associated with sedimentation. Threshold values may vary widely among state and tribal agencies (USEPA 2003), and metrics such as turbidity are sensitive to a variety of chemical and biological factors (such as algae and tannins) and may not clearly represent conditions related specifically to sediment inputs. Despite these inconsistencies, one commonly used impact threshold is one in which the metric of impact is increased by 10 percent or more (USEPA 2003). This approach recognizes the biological reality that even a relatively small (in absolute terms) amount of sediment may degrade a pristine stream, while a larger amount might be needed to further degrade a historically impacted stream. Therefore, to identify the extent of sedimentation effects from the proposed

action on JNF (i.e., Cumulative Effect boundaries), stream segments downstream with a 10 percent increase over baseline in maximum yearly load are delineated.

2.3.6 Special Conservation Measures within the Craig Creek Drainage (pg O3-17)

During preliminary analyses, it was recognized that sediment produced by the Project may impact the Craig Creek mainstem up to several miles downstream of the Project footprint. In order to limit this potential, several conservation measures were developed for this basin that will help minimize sedimentation into this important waterbody. These measures include: 1) a construction timeline that immediately follows tree clearance with the Craig creek drainage, 2) a restoration timeline that follows within 8 weeks of temporary stabilization, 3) a regimen that includes mulching areas denuded for more than 4 days, 4) a schedule that involves mulching backfilled areas of the trench within 4 days, and 5) the continuation of temporary sediment controls for 1-year after seeding. All of these factors are included within this analysis.

See figure 4 in appendix O – includes map of Craig Creek.

